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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/877,801	06/06/2001	Andrew S. Keys	MFS-31565-1	1358

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EXAMINER	
MOONEY, MICHAEL P	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 06/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/877,801	KEYS ET AL.	
	Examiner	Art Unit	
	Michael P. Mooney	2877	

-- The MAILING DATE f this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,7-14,16-18 and 20-22* is/are rejected.

7)☒ Claim(s) *4-6,15 and 19* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 7-10 are rejected under 35 U.S.C. 102b as being anticipated by Fork et al. (6028693).

Fork et al. teaches an optical phase modulator comprising: a multilayer stack, comprising a plurality of dielectric layers and having a transmission function related to at least one optical property of the stack, for receiving an optical input signal to be phase modulated; and phase modulator means for producing a nonmechanical change in the at least one optical property of the stack to provide shifting of the transmission function (e.g., col. 15 lines 19-38; col. 16 lines 25-64; col. 18 lines 1-15; col. 10 lines 1-15) to produce phase modulation of the optical input signal and to thereby produce a phase modulated output signal, said multilayer stack being disposed perpendicular to the optical signal to be modulated so that the signal passes serially through each dielectric layer of the plurality of dielectric layers. (figs. 1A-1C, 3A-3B; col. 8 lines 25-62; col. 9 lines 5-20).

Thus claim 1 is met.

Fork et al. teaches a phase modulator according to claim 1 wherein said multilayer stack comprises a bandpass multilayer stack. (col. 17 lines 45-50). Thus claim 2 is met.

Fork et al. teaches a phase modulator according to claim 1 wherein said at least optical property is refractive index, said dielectric layers each have a refractive index value, and said phase modulator means causes a variation in the refractive index of said dielectric layers such as to produce the shift in the transmission function. (col. 8 lines 25-62). Thus claim 3 is met.

Fork et al. teaches a phase modulator according to claim 1 wherein said dielectric layers comprise both layers having a high index of refraction and layers having a low index of refraction. (col. 8 lines 42-47). Thus claim 7 is met.

Fork et al. teaches a phase modulator according to claim 1 wherein said dielectric layers include alternating GaAs and AlAs layers. (e.g., col. 12 lines 25-30). Thus claim 8 is met.

Fork et al. teaches a phase modulator according to claim 8 wherein layers of relatively thin layers of AlAs are inserted within selected layers of GaAs to smooth the transmission function of the stack. (e.g., col. 11 lines 25-43; col. 12 lines 25-30). Thus claim 9 is met.

Fork et al. teaches a phase modulator according to claim 8 wherein said layers include a plurality of relatively thick layers of GaAs are interspersed at regular intervals within the stack. (e.g., col. 11 lines 25-43; col. 12 lines 25-30). Thus claim 10 is met.

Claims 11-14, 16-18, 20-22 are rejected under 35 U.S.C. 103a as being unpatentable over Fork et al. (6028693).

Fork et al. teaches an optical phase modulator comprising: a multilayer stack, comprising a plurality of dielectric layers and having a transmission function related to at least one optical property of the stack, for receiving an optical input signal to be phase modulated; and phase modulator means for producing a nonmechanical change in the at least one optical property of the stack to provide shifting of the transmission function to produce phase modulation of the optical input signal and to thereby produce a phase modulated output signal, said multilayer stack being disposed perpendicular to the optical signal to be modulated so that the signal passes serially through each dielectric layer of the plurality of dielectric layers. (figs. 1A-1C, 3A-3B; col. 8 lines 25-62).

Although Fork et al. does not explicitly state "wherein said modulation means comprises means for optically generating free carriers to provide phase modulation of the optical input signal" it would have been obvious to do so because it is notoriously well known (NWK) that the modulation means used in Fork et al. (e.g., col. 8 lines 25-62; col. 12 lines 30-48) comprises means for optically generating free carriers to provide

phase modulation of the optical input signal for the purpose of optimizing phase modulation.

Thus claim 11 is rejected.

Fork et al. teaches a phase modulator according to claim 1 wherein said at least optical property is refractive index, said dielectric layers each have a refractive index value, and said phase modulator means causes a variation in the refractive index of said dielectric layers such as to produce the shift in the transmission function. (col. 8 lines 25-62).

Although Fork et al. does not explicitly state "wherein said modulation means comprises means for optically generating free carriers to provide phase modulation of the optical input signal" it would have been obvious to do so because it is notoriously well known (NWK) that the modulation means used in Fork et al. (e.g., col. 8 lines 25-62; col. 12 lines 30-48) comprises means for optically generating free carriers to provide phase modulation of the optical input signal for the purpose of optimizing phase modulation.

Thus claim 12 is rejected.

Furthermore, although Fork et al. does not explicitly state "wherein said modulation means comprises means for externally injecting free carriers to provide phase modulation of the optical input signal" it would have been obvious to do so because it is notoriously well known (NWK) that the modulation means used in Fork et al. (e.g., col. 8 lines 25-62; col. 12 lines 30-48) comprises means for externally injecting

free carriers to provide phase modulation of the optical input signal for the purpose of optimizing phase modulation.

Thus claim 13 is rejected.

Furthermore, although Fork et al. does not explicitly state "wherein said modulation means comprises free carrier injection means for adjusting free carrier flow through the stack so as to vary the refractive index of the layers." it would have been obvious to do so because it is notoriously well known (NWK) that the modulation means used in Fork et al. (e.g., col. 8 lines 25-62; col. 12 lines 30-48) comprises free carrier injection means for adjusting free carrier flow through the stack so as to vary the refractive index of the layers for the purpose of optimizing phase modulation.

Thus claim 14 is rejected.

Furthermore, although Fork et al. does not explicitly state "wherein said dielectric layers include GaAs layers, wherein at least one quantum well (e.g., col. 8 lines 1-6) is created within each GaAs layer" it would have been obvious to do so because it is notoriously well known (NWK) that dielectric layers that include GaAs layers in such as in Fork et al. have at least one quantum well created within each GaAs layer. Additionally, Fork et al. teaches modulation means comprises means for applying an electric field to the layers of said stack

Thus claim 16 is rejected.

By the reasons and/or references given above each and every element of claims 17-18 are also rendered obvious by Fork et al. (see also: col. 15 lines 5-20). Thus claims 17-18 are rejected.

By the reasons and/or references given above each and every element of claims 20-22 are also rendered obvious by Fork et al. Thus claims 20-22 are rejected.

Allowable Subject Matter

Claims 4-6, 15, 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Mooney whose telephone number is 571-272-2422. The examiner can normally be reached during weekdays, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-1562.

Michael P. Mooney
Examiner
Art Unit 2877

Frank G. Font
Supervisory Patent Examiner
Art Unit 2877

FGF/mpm
5/31/04